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**FROM:** David Gay  
**Total Pages (including Cover Sheet):** 12  
**Date:** Sept 11, 1996  
**Phone Number:** 303 740-2872

**Message:**

I received the following from Richard Fisher at the Forest Service. It has some guidance on the "mixed field" etc.

I am working w/ Jeff Yehas a modeler w/ Woodward-Clyde to develop an estimate for this work.

David  
Gay

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## ISSUES ASSOCIATED WITH THE IMPLEMENTATION OF A CLASS I PROGRAM

4-15-96 update

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### HISTORY

During the 1991 annual Environmental Protection Agency (EPA) Regional/State Modelers Workgroup meeting, a workgroup entitled the Class I Area Workgroup (CIAW) was formed for the purpose of discussing modeling issues associated with Class I Prevention of Significant Deterioration (PSD) and Air Quality Related Values (AQRVs) impact assessments. In the course of these discussions, it became apparent that even if the modeling techniques could be agreed upon between the various Federal Agencies, there would remain still both technical and policy issues. To address the coordination between Federal Agencies of modeling techniques involving long-range transport, the Interagency Workgroup for Air Quality Models (IWAQM) was formed. The membership of IWAQM includes participants from the National Park Service, the Forest Service, the Fish and Wildlife Service. State representatives from Virginia, Oregon, and Washington also participated in these meetings. The discussions within the CIAW continued at the 1992 and 1993 annual Regional/State Modelers Workgroup meetings and it seems to be a trend that many of the remaining issues involve both technical and policy considerations. The following summarizes the high points of discussions that have occurred within CIAW and IWAQM.

A heightened interest in Class I impacts and an increasing need to model more sources involving Class I impacts has resulted in the recognition that guidance in this area is in need of improvement. In general, the fact that Class I area analyses focus on a fixed piece of real estate sets them apart from Class II analyses. In Class II analyses, the area of concern is a circular area (typically of radius 50 km or less) centered on the source in question; whereas in Class I analyses the source and the Class I area are usually separated by a significant distance. This sets up a unique set of issues which need consideration

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from and cooperation among a variety of organizations given the need to assess the increment increase in concentration values, the need to evaluate impacts on Air Quality Related Values (AQRV), and the added role of the Federal Land Manager (FLM).

In an attempt to address some of the technical concerns unique to Class I area analyses, the Interagency Workgroup on Air Quality Modeling (IWAQM) was formed. This workgroup has offered an interim (Phase I) approach for modeling Class I area impacts. The Phase I approach is based on purely "off the shelf" technology. Soon, IWAQM will release a Phase II recommendation. The Phase II approach will involve use of more advanced "state-of-science" modeling techniques.

In addition to the need for development of modeling methods tailored to the special needs of assessing Class I increment and impacts on AQRVs, other issues must be resolved before a comprehensive Class I area program can be implemented. Discussions, over the past few years, among Federal and State modelers have resulted in both a defining of issues and opinions on possible solutions. The following provides a summary of those discussions. It also incorporates some of the issues that were addressed in the April 3, 1996 EPA announcement<sup>3</sup> on the proposed reforms to the PSD program.

### **OUTLINE OF SPECIFIC ISSUES**

#### **I. Implementation Policy Issues:**

In order to properly implement a Class I New Source Review (NSR) program, the following items need to be developed:

- A. Increment Tracking system
- B. Equitable, interstate procedure for deciding how much control to obtain from identified sources
- C. Interstate offset program
- D. Interstate overall program coordination of some form (with necessary funding)
- E. Interstate database management system
- F. Necessary computer facilities, training and other resources in each state.

#### **II. Adverse Impact Thresholds**

- A. Development of objective criteria for both Increment & protection levels for AQRVs.
- B. Thresholds for Increment and AQRV protection will need to be defined differently.
- C. Should the criteria be the same for those areas that are presently adversely impacted?

<sup>3</sup> EPA announcement that the proposed rulemaking for *Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR)* had been signed and will appear shortly in the Federal Register. These changes will affect 40 CFR Parts 51 and 52.



### **III. Inventory Development:**

- A. How far out should the inventory extend?
- B. What size sources should be included in the inventory?
- C. Is the John Seitz memorandum<sup>4</sup> of Oct 19, 1992 adequate since it does not address minor sources and since it does not provide definitive guidance on sources to be consider beyond 100 km?

### **APPROACH**

Both policy and technical issues are discussed in this paper. While policy issues cannot be resolved by IWAQM or other technical workgroups, they still need to be addressed. The purpose of IWAQM is to facilitate the process of assessment by helping with technical issues.

Several groups are currently working on implementing a regional approach. The lessons from their work should be invaluable to others. These include:

NESCAUM (North East States Consortium for Air Use Management) is implementing a regional study of impacts on Class I areas in the New England area. This requires the coordination of a number of northeastern states.

Florida is implementing a regional study of impacts on a Class I area in central Florida. This area is unique in that the regional study of this area can be handled entirely within Florida.

Washington is studying the possibility of implementing a regional study of impacts at the Mt. Rainier N.P. Class I area. This will require coordination with other states as well as British Columbia. WESTAR (Western States Air Resources Council) may also be involved in developing a regional approach.

The Grand Canyon Visibility Transport Commission has been involved with an extensive study of long range impacts on the Grand Canyon.

Colorado has been involved with a regional study of impacts on Mt. Zirkel.

### **GENERAL FINDINGS**

Federal and State modelers have struggled with the issues related to Class I area analyses and have found their resolutions to be elusive. After significant discussion within IWAQM there is a consensus opinion that the basic problem relates to the uniqueness of

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<sup>4</sup> The recommendations from this memorandum have been incorporated into the 4/3/96 proposed rulemaking for reforming PSD and NSR.





the Class I program. While this program is fundamentally different from other air programs (such as, Class II and State Implementation Plans (SIP's)), the Federal Agencies unfortunately have attempted to implement the assessment of Class I impacts as if the assessment is similar to that associated with Class II and SIP impacts. This lead to several problems, for example, the Class II program requires that analyses be performed within a domain on the order of 50 kms or less and centered on the source (the domain changes from permit to permit). Given the small domain, Class II analyses lend themselves to individual state implementation. Class I analyses, on the other hand, are centered on specific land areas. Therefore, the modeling domain does not change from permit to permit. Furthermore, these analyses involve a modeling domain on the order of hundreds of kms, thus requiring multi-state coordination. Additionally, Class I area analyses for AQRV impacts may require estimating the deposition of secondary pollutants and their impact on visibility. Finally, the affirmative responsibilities of the FLM's significantly adds to the coordination difficulties inherent in the program.

Although some of the technical demands of the program are being addressed by the IWAQM, the obvious need to organize on a regional basis has yet to be addressed. IWAQM believes that many of the concerns and problems currently associated with assessing Class I impacts, might be addressed by invoking a regional viewpoint to the implementation of the Class I program.

The IWAQM is presently developing technical tools to assist in the analyses associated with implementation of a Class I program. Their Phase I recommendation is now available. Although this work is a necessary part of any Class I area program, it does not provide sufficient implementation guidance.

IWAQM suggests that consideration be given to seeing if a regional viewpoint would aid in resolving the coordination issues between the EPA, the States and the FLMs. IWAQM has performed a Demonstration Project, the primary purpose of which was to investigate the problems that may arise in using the IWAQM Phase I recommendations to assess Class I impacts. This effort could act as an effective mechanism to initiate a dialog between the various groups that ultimately might foster the development of a regional approach.

The IWAQM Demonstration Project was conceived as a test of the Phase I recommendation. This Project was centered on Shenandoah National Park in Virginia. It was also intentioned that a similar demonstration project would be conducted for the Phase II recommendations. However, inadequate funding may prohibit this work from being initiated. The NESCAUM workgroup is currently setting up a demonstration study for the implementation of their work. Such demonstration studies are encouraged as they can help States work together and to iron out both technical and policy issues.

The work effort in the IWAQM Phase I Demonstration Project involved coordination between representatives from IWAQM, FLM's, States and EPA Region III. The goal of this coordinated effort was to deal with the technical issues as they arise within the course



of the work effort. Any effort has its limitations, and it would be unrealistic to presume that within any Demonstration Project that all issues would be addressed and resolved. The results of the IWAQM Demonstration Project may be of interest to groups such as the Southern Appalachian Mountain Initiative (SAMI), Western States Air Resources Council (WESTAR) and the Federal Advisory Committee Act (FACA) Subcommittee for New Source Review.

The Demonstration Project provided information and results that could serve as a basis for formulating future activities to address the most pressing unresolved issues or concerns.

Based on recommendations from the CIAW, EPA announced proposed rulemaking (4/3/96) to improve FLM/Permitting Authority coordination. This includes a general provision which requires that the permitting authority provide for consultation and coordination with the FLM (proposed 40 CFR 51.155(p)(2)(iii) and 40 CFR 52.21 (p)(2)(iii).

### SPECIFIC ISSUES

#### **I. NEED FOR COORDINATION:**

Any effective Class I area program will need to provide for the coordination and management of interstate data bases (meteorological and source emissions) and interstate emission reductions.

Regional groups consisting of EPA, the FLM's and the States could form to provide the needed coordination and management. These groups could be considered on a Class I area specific basis. The regional group for each Class I area of interest will probably be formed differently depending on the amount of coordination that is needed.

#### **II. INCREMENT TRACKING:**

We recognize that there are many obstacles that make direct increment tracking very difficult, if not impossible. One of the biggest obstacles is that we are dealing with actual emissions. Area and minor sources present other obstacles. In the West, large open burning area sources such as forest slash burning may consume significant increment.

Rather than tracking increment, the expansion of the increment consuming inventory of sources could be tracked. Modeling results based on the emissions from these sources can then be used to determine the available increment. This would provide a consistent means for defining increment with allowances for changes in emissions, as well as, changes and improvements in modeling capabilities.

As increment tracking is handled by the individual PSD delegated states, they will need to determine a cooperative policy for offsets that affect Class I areas.



### III. DATA BASE MANAGEMENT:

#### EMISSIONS:

Keeping track of emissions on a regional basis will require data base management beyond what is presently done. It would be useful to maintain two databases; the first a simple listing of sources and the second a complete inventory.

The listing would only contain the names and locations of Prevention of Significant Deterioration (PSD) increment effecting sources. This listing would act as a "pointer" to the state data base. The listing could be maintained by the individual FLMs for each Class I area.

The complete inventories developed for specific Class I areas could be maintained by the State within which the Class I area resides. Thus the State could continue to be the primary resource for the emissions data. They currently have the primary responsibility for maintaining the emissions data.

The advantage of this method is that new applicants would be required to contact the FLMs early in the process to find out the competing sources that should be included in an analysis. Such a listing should be easy to maintain. It could be in the form of one letter sized sheet of paper with the names and locations of the sources. It does not require a computerized data base. Its benefit will be in reducing search time for the applicants and the regulatory agencies, as well as, insuring consistency among permits. Another benefit is that it insures a proactive role for the FLM to maintain the list and to be informed of pending actions. Currently, states do not have ready access to the names and locations of competing PSD sources from other states.

The state emissions data bases already exist. However, not all the information needed for an analysis may be available from the states. In particular, stack parameters may not be readily available. These problems will need to be dealt with on a case-by-case basis.

For some parts of the nation, a regional emissions inventory may be available. Currently the Grand Canyon Visibility Transport Commission has contracted for a regional emissions inventory of sources affecting the Grand Canyon. It covers a large area of the western United States.

IWAQM also discussed the possibility of regional groups maintaining their own emission data bases. While this may be desirable, there are potential problems that would need to be resolved before it could be implemented. Emissions estimates for individual point sources and area sources often change. Even historical data can change due to revised emission factors or from the discovery of errors. Somehow these changes would have to be reflected in the regional data bases as they are made at the individual state level.



## **METEOROLOGY, TOPOGRAPHY, AND LAND USE DATA:**

For meteorology, data preprocessing will be required. The Demonstration Project showed how much effort was required to create a regional meteorological data base (from scratch), and how this data base could be shared by the included states.

Processing of meteorological data requires significant resources; the demonstration that these data can be provided on a regional basis is important. It may be critical for the successful implementation of the IWAQM approach.

One resource that IWAQM has provided is the availability of 1990 MM-4 derived "soundings" for the entire continental USA. These are available on a 80 kilometer resolution on a series of CD-ROMs. IWAQM recommends that this data be used as model input for one of the years that is studied in the regional analysis. If possible, two other years should also be used in the analysis<sup>5</sup>.

An additional problem may occur with choosing meteorological data for Class I areas. If some sources are located close to a Class I area, then more refined meteorological data may be needed for those sources. More distant sources could use regional (e.g., MM-4) meteorological data into the modeling system.

Currently topography and land use data for the continental USA have been obtained by the National Park Service (NPS). The Demonstration Project has shown how to acquire these various data bases and how these data can be provided to individual applicants or states.

## **IV. RESOURCE NEEDS:**

Full implementation of a regional approach centered on particular Class I areas will require additional funds for individual states and regional groups. This will certainly include the need for upgraded computer hardware and maintenance. Additionally, this will require an increase in staff and training of existing staff.

## **V. OFFSET PROGRAM:**

When an analysis indicates that all available increment has been consumed or a Class I area is expected to be adversely impacted by a new source, permitting can usually proceed through some form of offsetting. In general, an offset program can take one of two forms: ( ) Emissions Based: reduce emissions at an existing plant by some percentage of the new source's emissions, generally greater than one for one. This

<sup>5</sup> A total of three years is recommended. However, IWAQM recognizes that initialization may start by using a single year while the program is being developed.





approach is independent of the impact of the emissions. (2) Impact or Effects Based: reduce emissions at an existing plant by an amount that offsets the adverse impact predicted from the new plant.

To insure that the offsetting emissions will provide a benefit that protects the Class I area resources, IWAQM suggests an impact based program be considered. Only if the proposed offsetting emission are simulated using atmospheric transport and dispersion models can one assure the consequences of the proposed offsets.

## **VI. ADVERSE IMPACT THRESHOLDS:**

From a practical point of view, a new source permitting program should include a relatively simple way of screening out those sources whose impacts are insignificant. A means to accomplish this would be to establish (in)significance criteria against which the individual impacts from the new source could be judged. This is especially important in a Class I program since full increment or AQRV impact analyses are resource intensive.

EPA recently proposed significance criteria for the PSD Class I increment. This proposal was addressed by the New Source Review Reform process (EPA proposal of April 3, 1996). IWAQM had presented this issue and others to the New Source Review Reform Committee.

Developing significance criteria for AQRV protection is a more difficult issue. Although there is a similar need for such criteria there is an inherent difficulty with developing national criteria. Sensitivity levels for AQRVs are, by definition, Class I area specific. Therefore, determining what incremental impact is significant may need to be done for each area individually. However, there is a need to find an approach which avoids having an applicant perform an analysis without knowing what will be considered a problem. A possibility could be for the FLM's to quantitatively define AQRV protection significance criteria on a case-by-case basis at a time early in the permitting process and prior to the performance of any modeling.

The 4/3/96 EPA announcement of proposed rulemaking specifically addresses this area. EPA agreed that the FLM should be expressly recognized as having the primary responsibility for the identification of specific AQRV protection levels. EPA also proposed significant impact levels for protecting Class I Increments. Two levels of protection are shown in the announcement. One set of levels were proposed by EPA, while another was proposed by the FLMs. However, this same announcement cautions that these levels are not intended to serve as thresholds for determining whether an adverse impact will occur on AQRVs.



## VII. INVENTORY DOMAIN:

A controversial issue related to Class I analyses is the development of the emissions inventory. Given the small size of the increments, impact from distant sources can be important. Furthermore, there does not exist, as yet, a "technical" criterion such as exists for steady state modeling (i.e., 50 kms.)<sup>6</sup>.

In order to implement the Class I program many states for years have used 100 km as a "bright line" criteria. Recently the FLM's have challenged this practice claiming that sources at greater distances should be included in the analysis. In responding to this issue EPA has developed a position. In a memo from OAQPS to the EPA regions (10/19/93 Seitz to Air Directors) the 100 km criteria was found to be generally acceptable but not a limiting distance. The memorandum has a caveat that large sources beyond that distance may need to be included in the analysis. This memorandum is cited in the April 3, 1996 EPA announcement. It resulted in different reporting requirements (to the FLM) for an applicant depending on whether the source is less than or greater than 100 km from the Class I area. In general, the FLM must be notified of sources locating within 100 km. Beyond 100 km, the source must be listed in a data base that can be accessed by the FLM.

There seems to be a consensus opinion among modelers that developing objective criteria are inherently problematic for selecting which source emissions should be explicitly included in a modeling inventory. Given the fact that Class I areas are fixed in space, one approach might be to conduct an up-front analysis outside the context of a permit to initialize the system. An outline of this approach is provided in the Appendix to this document.

Since this inventory will in large measure be used for future permits, its development could be determined through the cooperation of the states and the FLM at the time of the initialization analysis. For subsequent permits, one would expect there to be only small changes made to the source inventory. As these changes are made, the inventory, which is specific for a given Class I area, will evolve naturally with each permit or periodic state audit.

IWAQM's Phase I Demonstration project explored the issue of how distance affects impacts in a Class I area. In general, they found that even a 200 kilometer "bright line" may not be sufficiently large to have insignificant impacts at the Class I area. Part of the reason for this finding was that more sources are brought into the analysis as distance increases.

<sup>6</sup> Under the current Guideline on Air Quality Models, two different models may be required depending of the distance from the Class I area to the source. A Guideline model is required for sources located within 50 km. Beyond 50 km, an IWAQM model may be used. However, the use of two models in a regional modeling study is onerous. The IWAQM phase II model may be able to predict impacts in both areas.

